substrate is completely depleted in a state in which a reverse bias is applied between said first electrode and said second electrode.

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-22 are pending in the present application. Claims 1-15, 17-20 and 22 have been amended by the present amendment.

In the outstanding Office Action, Claims 1-22 were rejected under 35 U.S.C. § 112, second paragraph, which is respectfully traversed.

In response to Applicant's previous arguments filed on April 26, 2002, the outstanding Office Action indicates the claims disclose layers whereas the specification discloses regions and therefore the limitations are inconsistent with the claims and specification. Accordingly, in light of this indication, the term "layer" has been changed to "region" as appropriate throughout the claims. Other appropriate changes have also been made to correspond with the change of the term "layer" to "region."

In addition, the outstanding Office Action indicates it is unclear how the structure of the light-receiving device will be formed when the third semiconductor layer is formed on the surface of the first semiconductor layer and surrounds a plurality of second semiconductor layers that are formed in the first semiconductor layer. In response to this inquiry, the following is submitted.

With reference to Figure 2E, the present invention is directed to a semiconductor light-receiving device including a first conductivity type (n+) semiconductor substrate (1) having a first surface on a light-receiving side and a second surface on the opposite side to

the first surface, and a first semiconductor layer (2) formed on the first surface of the semiconductor substrate. Further, a plurality of first conductivity type (n+) semiconductor regions (4) reach the semiconductor substrate (1) from a surface of the first semiconductor layer (2) and in which the first conductivity type semiconductor regions (4) are formed apart from each other.

Further, a second conductivity type (p+) semiconductor region (3) is selectively formed on the surface of the first semiconductor layer (2) and in which the second conductivity type semiconductor region (3) surrounds each of the first conductivity type semiconductor regions (4) with a portion of the first semiconductor layer (2) therebetween. This feature is clearly shown in Figures 2B and 2E, for example, in which the semiconductor region (3) surrounds each of the semiconductor regions (4) with the first semiconductor layer (2) therebetween.

In addition, the semiconductor region (3) is lying directly under the p-side electrode (5) and in a region corresponding to the region where the p-side electrode (5) exists as shown in Figures 1A and 1B. The semiconductor region (3) is hiding under the p-side electrode (5) and does not appear in Figure 1A. The p-side electrode (5) is surrounding the semiconductor regions (4) in Figure 1A, and the semiconductor region (3) is also surrounding the semiconductor regions (4) with the first semiconductor layer (2) disposed therebetween with reference to Figure 1B.

Therefore, in light of the above discussion, it is respectfully requested the rejection of Claims 1-22 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

--1. (Amended) A semiconductor light-receiving device comprising:

a first conductive type semiconductor substrate having a first surface on a light-receiving side and a second surface on the opposite side to said first surface;

a first semiconductor layer formed on said first surface of said semiconductor substrate;

a plurality of first conductive type [second] semiconductor [layers] regions reaching said semiconductor substrate from a surface of said first semiconductor layer, said [second] first conductive type semiconductor [layers] regions being formed apart from each other;

a second conductive type [third] semiconductor [layer] region selectively formed on the surface of said first semiconductor layer, said [third] second conductive type semiconductor [layer] region surrounding each of said [second] first conductive type semiconductor [layers] regions with a portion of said first semiconductor layer therebetween;

a first electrode formed on said [third] second conductive type semiconductor [layer] region; and

a second electrode formed on said second surface of said semiconductor substrate;

[wherein a region] said portion of said first semiconductor layer between each of said [second] first conductive type semiconductor [layers] regions and said [third] second conductive type semiconductor [layer has] region having a higher resistance than resistances

of said [second] first conductive type semiconductor [layers] regions and said [third] second conductive type semiconductor [layer] region.

2. (Amended) The semiconductor light-receiving device according to claim 1, wherein said [third] second conductive type semiconductor [layer] region has a lattice form or a network form.

3. (Amended) The semiconductor light-receiving device according to claim 2, wherein said first electrode has the lattice form or the network form and is provided on said [third] second conductive type semiconductor [layer] region.

4. (Amended) The semiconductor light-receiving device according to claim 1, wherein said first electrode is formed on part of said [third] second conductive type semiconductor [layer] region.

5. (Amended) The semiconductor light-receiving device according to claim 1, wherein each of said [second] first conductive type semiconductor [layers] regions has an island form or a stripe form.

6. (Amended) The semiconductor light-receiving device according to claim 1, wherein the [region] portion of said first semiconductor layer between said [third] second conductive type semiconductor [layer] region and each of said [second] first conductive type semiconductor layers is completely depleted in a state in which a reverse bias is applied between said first electrode and said second electrode.

7. (Amended) A semiconductor light-receiving device comprising:

a first conductive type semiconductor substrate having a first surface on a light-receiving side and a second surface on the opposite side to said first surface;

a first semiconductor layer formed on said first surface of said semiconductor substrate;

a plurality of first conductive type [second] semiconductor [layers] regions reaching said semiconductor substrate from a surface of said first semiconductor layer, said [second] first conductive type semiconductor [layers] regions being formed apart from each other;

a second conductive type [third] semiconductor [layer] region selectively formed on the surface of said first semiconductor layer and having a plurality of openings, each of said [second] first conductive type semiconductor [layers] regions being provided within each of said openings of said [third] second conductive type semiconductor [layer] region respectively with a portion of said first semiconductor layer therebetween;

a first electrode formed on said [third] second conductive type semiconductor [layer] region; and

a second electrode formed on said second surface of said semiconductor substrate;

[wherein a region] said portion of said first semiconductor layer between each of said [second] first conductive type semiconductor [layers] regions and said [third] second conductive type semiconductor [layer] region has a higher resistance than resistances of said [second] first conductive type semiconductor [layers] regions and said [third] second conductive type semiconductor [layer] region.

8. (Amended) The semiconductor light-receiving device according to claim 7, wherein said first electrode has a lattice form or a network form and is provided on said [third] second conductive type semiconductor [layer] region.

9. (Amended) The semiconductor light-receiving device according to claim 7, wherein said first electrode is formed on part of said [third] second conductive type semiconductor [layer] region.

10. (Amended) The semiconductor light-receiving device according to claim 7, wherein each of said [second] first conductive type semiconductor [layers] regions has an island form or a stripe form.

11. (Amended) The semiconductor light-receiving device according to claim 7, wherein the [region] portion of said first semiconductor layer between said [third] second conductive type semiconductor [layer] region and each of said [second] first conductive type semiconductor [layers] regions is completely depleted in a state in which a reverse bias is applied between said first electrode and said second electrode.

12. (Amended) A semiconductor light-receiving device comprising:

a first conductive type semiconductor substrate having a first surface on a light-receiving side and a second surface on the opposite side to said first surface, said first surface including a plurality of protruded surface portions separated from each other;

a first semiconductor layer selectively formed on said first surface of said semiconductor substrate, said first semiconductor layer having a higher resistance than a resistance of said semiconductor substrate and having a plurality of openings, each of said protruded surface portions of said first surface being exposed within each of said openings of said first semiconductor layer respectively;

a second conductive type [second] semiconductor [layer] region selectively formed on a surface of said first semiconductor layer and surrounding each of said protruded surface portions of said first surface with a portion of said first semiconductor layer therebetween;

a first electrode formed on said second conductive type semiconductor [layer] region; and

a second electrode formed on said second surface of said semiconductor substrate.

13. (Amended) The semiconductor light-receiving device according to claim 12, wherein said second conductive type semiconductor [layer] region has a lattice form or a network form.

14. (Amended) The semiconductor light-receiving device according to claim 13, wherein said first electrode has the lattice form or the network form and is provided on said second conductive type semiconductor [layer] region.

15. (Amended) The semiconductor light-receiving device according to claim 12, wherein said first electrode is formed on part of said second conductive type semiconductor [layer] region.

17. (Amended) The semiconductor light-receiving device according to claim 12, wherein [a region] said portion of said first semiconductor layer between said second conductive type semiconductor layer and each of said protruded surface portions of said semiconductor substrate is completely depleted in a state in which a reverse bias is applied between said first electrode and said second electrode.

18. (Amended) A semiconductor light-receiving device comprising:

a first conductive type semiconductor substrate having a first surface on a light-receiving side and a second surface on the opposite side to said first surface, said first surface including a plurality of protruded surface portions separated from each other;

a first semiconductor layer selectively formed on said first surface of said semiconductor substrate, said first semiconductor layer having a higher resistance than a resistance of said semiconductor substrate and having a plurality of openings, each of said protruded surface portions of said first surface being exposed within each of said openings of said first semiconductor layer respectively;

a second conductive type [second] semiconductor [layer] region selectively formed on a surface of said first semiconductor layer and having a plurality of openings, each of said protruded surface portions of said first surface being provided within each of said openings of said second conductive type semiconductor [layer] region respectively with a portion of said first semiconductor layer therebetween;

a first electrode formed on said second conductive type semiconductor [layer] region; and

a second electrode formed on said second surface of said semiconductor substrate.

19. (Amended) The semiconductor light-receiving device according to claim 18, wherein said first electrode has a lattice form or a network form and is provided on said second conductive type semiconductor [layer] region.

20. (Amended) The semiconductor light-receiving device according to claim 18, wherein said first electrode is formed on part of said second conductive type semiconductor [layer] region.

22. (Amended) The semiconductor light-receiving device according to claim 18, wherein [a region] said portion of said first semiconductor layer between said second conductive type semiconductor [layer] region and each of said protruded surface portions of said semiconductor substrate is completely depleted in a state in which a reverse bias is applied between said first electrode and said second electrode.--